

## USER OCCUPANCY CLASSIFICATIONS AND EGRESS REQUIREMENTS

### 1.0 PURPOSE

This document shall provide guidance in the determination of the proper code application in the “user occupancy classifications” and “egress requirements”.

### 2.0 GENERAL

The intent of FME (Facility Maintenance and Engineering) is to follow the national consensus codes and standards ICC (International Code Council/BOCA International) and NFPA (National Fire Protection Association) particularly NFPA 101 Series (Life safety code). The NIH (National Institutes of Health) Guidelines are applicable for NCI (National Cancer Institute) at Frederick facilities. Also, the Authority Having Jurisdiction (AHJ) rests with the NCI and therefore the ultimate responsibility of design concerns and aspects are the NCI’s responsibility.

2.1 “When there is a conflict between the various code requirements, always the most stringent/conservative standard should apply.”  
(NIH-HSEP/H.8.1)

2.2 “The NIH re-design policy is based on a project having only a one-year shelf life. Any project which has been shelved or inactive for one year or more must go through a review process to ensure compliance with the latest published codes and standards.”  
(NIH/HSEP/H.8.1)

### 3.0 RESPONSIBILITY

- a) All designs for new structures (including new wings), other additions, renovated areas of existing buildings and those which include the addition or modification of fire protection systems or egress components shall have a “Fire Protection Engineering Analysis” performed by an architect or an engineer at the concept and final design phase.
- b) This procedure shall occur on or before the “Fire Protection Guidelines” (Exhibit G, Section II) where the decisions shall be made establishing sprinkler requirements. It shall use the “Request for Exemption to NIH Guidelines” form (Exhibit H), should that be applicable or necessary.

### 4.0 PROCEDURE

4.1 Design and Construction, Existing or New the classification of the area(s) and means of egress design requirements shall be determined by the following codes (latest edition):

4.1.1 Life Safety Code (NFPA 101 Series)

4.1.2 Fire Protection for Laboratories Using Chemicals (NFPA 45)

4.1.3 Standard for Health Care Facilities, Laboratories Chapter (NFPA 99; Chapter 10)

4.1.4 Standard System for the Identification of the Hazards of Materials for Emergency Response, (NFPA 704)

4.1.4 International Buildings Code (BOCA / ICC)

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### 4.1.5 International Fire Code (BOCA / ICC)

### 4.2 Classification and Egress Requirements per NFPA 101series.

#### 4.2.1 Classification of Occupancy

In order to design the appropriate exit system for an industrial occupancy, the life safety hazard classification per NFPA 101Series, *Life Safety code*, must be established. The three basic classifications include general industrial, special purpose industrial, and high hazard.

4.2.1.1 General-purpose (Industrial) occupancy: General-purpose occupancies involve low- and ordinary-hazard manufacturing operations occurring in any type of building, be it single-story, multi-story, or multiple tenant. These occupancies normally have a higher density of employees than the other classifications.

4.2.1.2 Special-purpose (Industrial) occupancy: Special-purpose occupancies also involve low-and ordinary-hazard manufacturing operations. They are characterized by low employee density, with most of the floor area occupied by equipment. These occupancies have slightly different exit requirements that are generally more lenient, such as an increase in the travel distance allowed. Also, exits are designed for the actual number of employees in the structure, rather than the calculated occupant load.

4.2.1.3 High-hazard (Industrial) occupancy: High-hazard occupancy differs from low- and ordinary-hazard occupancies by the materials used and the potential results and byproducts of the use. High-hazard occupancies include structures in which there are processes involving highly combustible, highly flammable, or explosive materials, or structures in which materials are likely to burn with extreme rapidity or to produce poisonous fumes or gases. Also included are industrial facilities in which flammable liquids are routinely handled, used, or stored in large quantities or those in which explosive dusts from chemicals, plastic, aluminum, magnesium, or other explosive-dust-generating materials are produced/used/stored.

Structures with adequately protected, incidental high-hazard uses do not have to be classified as high-hazard facilities. Such structures may include such things as a small flammable liquid storage room designed to NFPA 101 Series, *Life Safety Code*, and NFPA 30, *Flammable and Combustible Liquids Code*.

4.2.1.4 Please note that NFPA 101A further defines the laboratory classification process by making a distinction between *Instructional Laboratories* under Business Occupancy, and *Other Laboratories*, with the following paragraph: “In evaluating the appropriate classification of laboratories, the Authority Having Jurisdiction should treat each case individually based on the extent and nature of the associated hazards. Some laboratories are classified as occupancies other than industrial; for example, a physical therapy laboratory or a computer laboratory.”

#### 4.2.2 Means of Egress Design Requirements

Designing the exit system for a building requires consideration of distance requirements, such as travel distance, common path of travel, and dead ends. These distances vary based on the life safety hazard classification and the absence or presence of automatic sprinklers. Exit distance limitations are shown in Table below.

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### COMMON PATH, DEAD-END AND TRAVEL DISTANCE LIMITS (by occupancy)

Occupancy	Common Path Limit		Dead –End Limit		Travel Distance Limit		*Special Sprinklered
	Unsprinklered (feet)	Sprinklered (feet)	Unsprinklered (feet)	Sprinklered (feet)	Unsprinklered (feet)	Sprinklered (feet)	
Business	75	100	50	50	200	250	0
Industrial (I) General	50	100	50	50	200	250	400 ft.
I – Special Purpose	50	100	50	50	300	400	0
I – High Hazard	0	0			75	75	0

\*To use some of the greater distances, special requirements are involved, such as application to one-story buildings only, with automatic sprinklers mandatory and smoke and heat venting (in general-purpose occupancy only).

### 4.3 Classification and Egress Requirements per NFPA 45.

#### 4.3.1 Classification of Occupancy

Construction and Design: Specific details of construction and special facets of consideration change routinely with each type of laboratory. NFPA 45, Fire Protection for Laboratories Using Chemicals, contains detailed information on classifying laboratory units and work areas based on flammable and combustible liquid content. Another good source to consult to ensure that all requirements are met is NFPA 99, (Health Care Facilities) Chapter 10. For a guide for determining the applicability of NFPA 45 to a laboratory setting, see Appendix A (NFPA 45/2000 Edition) Fig. A.1.1.3 (Exhibit G (IA)) and Table A.1.3.2 (Page 5 of 5) – use of NFPA documents for laboratories.

#### 4.3.2 Means of Egress Design Requirements

Means of egress requirements for a laboratory building must agree with the exit requirements specified for the particular occupancy and type of building. Most laboratory buildings are constructed to comply with the exit requirements for general purpose or industrial buildings.

4.3.2.1 Two means of access to an exit from a laboratory work area are usually required. These should be located to provide access to exits from all parts of the work area larger than 1000 s. ft. (93 m<sup>2</sup>) or from a laboratory work area containing large quantities of flammable liquids with an area in excess of 500 sq. ft. (46 m<sup>2</sup>). A second means of egress is also required from a laboratory that has a laboratory hood adjacent to the primary means of egress or from one that contains substantial quantities of compressed gases.

### 4.4 Classification and Egress Requirements per NFPA 99

#### 4.4.1 Classification of Occupancy (Interface with Existing Codes and Standards)

4.4.1.1 NFPA 45 is the basic NFPA standard for laboratories that covers the classification of construction, ventilation systems, and related fire protection of all laboratories in all facilities. However, NFPA 99 Chapter 10 has more stringent requirements for laboratories located in health care facilities.

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- 4.4.1.2 Periodic reviews of laboratory operations and procedures shall be conducted with special attention given to any change in materials, operations, or personnel.

### 4.4.2 Means of Egress Design Requirements

Any room arranged for laboratory work that has an area in excess of 1000ft<sup>2</sup> (92.9 m<sup>2</sup>) shall have at least two exit access doors remote from each other, one of which shall open directly onto a means of egress. A second means of access to an exit shall be provided for any laboratory work areas in which hazards exist as defined in NFPA 45.

- 4.4.3 Hazard assessment, periodic reviews, reassessment of laboratory operations and procedures shall be conducted with special attention given to any change in materials, operations, or personnel especially at the time of a renovation of the laboratory.

## 4.5 Classification and Egress Requirements per BOCA/ICC (International Building Code (IBC) and International Fire Code (IFC))

### 4.5.1 Classification of Occupancy

In order to design the appropriate exit system for an industrial occupancy, which is the classification of most of our Laboratory construction/renovation projects, the hazard classification per BOCA requirement must be established as follows:

- 4.5.1.1 *Occupancy, Business:* College and university instructional buildings, classrooms under 50 persons, and instructional laboratories.
- 4.5.1.6 4.5.1.2 *Occupancy, Industrial:* In evaluating the appropriate classification of laboratories, the authority having jurisdiction should treat each case individually based on the extent and nature of the associated hazards. Some laboratories are classified as occupancies other than industrial; for example, a physical therapy laboratory or a computer laboratory. (Please note, our facility, in laboratory construction/renovation work, always uses Industrial Occupancy Classification.)
- 4.5.1.3 Mixed Occupancies.
- 4.5.1.4 *Non-separated uses:* Each portion of the building shall be individually classified as to use. The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building. The other requirements shall apply to each portion of the building based on the use of that space except that the most restrictive applicable provisions of the high rise building provisions and fire-protection system requirements shall apply to these non-separated uses.
- 4.5.1.5 *Separated uses:* Each portion of the building shall be individually classified as to use and shall be completely separated from adjacent areas by fire barrier walls or horizontal assemblies or both having a fire-resistance rating determined in accordance with BOCA/ICC – IFC, Chapter 3, for the uses being separated. Each fire area shall comply with the code based on the use of that space.

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4.5.1.7 *Multiple hazards*: Buildings and structures containing a material or materials representing hazards that are classified in one or more of Groups H-1, H-2, H-3, H-4 and H-5, shall conform to the code requirements for each of the occupancies so classified. (Please note, our facility, in laboratory construction/renovation work, most commonly uses H-2, H-3 & H-4 Occupancy Groups.)

### 4.5.2 Means of Egress Design Requirements

Means of egress requirements for a laboratory building must agree with the exit requirements specified for the particular occupancy and type of building. Most laboratory buildings are constructed to comply with the exit requirements for general purpose or industrial buildings at NCI-Frederick.

Designing the exit system for a building requires consideration of distance requirements, such as travel distance, common path of travel, and dead ends. These distances vary based on the life safety hazard classification and the absence or presence of automatic sprinklers BOCA classification Group B, H-2, H-3 and H-4. Exit distance limitations are shown in Table below.

COMMON PATH, DEAD-END AND TRAVEL DISTANCE LIMITS (by occupancy)

Occupancy	Common Path Limit		Dead –End Limit		Travel Distance Limit	
	Unsprinklered (feet)	Sprinklered (feet)	Unsprinklered (feet)	Sprinklered (feet)	Unsprinklered (feet)	Sprinklered (feet)
Group B	75	100	50	50	200	250
Group H-2	50	100			75	100
Group H-3	50	100	20	20	100	150
Group H-4	75	75	20	20	150	175

**Table A.1.3.2 Use of NFPA Documents for Laboratories**

<b><u>Location of Laboratory</u></b>	<b><u>Primary Reference Document</u></b>
Laboratory in a building with inpatients	99
Laboratory in a building with outpatients incapable of self-preservation	99
Laboratory in a building with outpatients capable of self-preservation	45
All other laboratories	45